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First herpetological surveys of Mount Lico and Mount Socone, Mozambique

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***Abstract.*—The first herpetological surveys of two mountains in northern Mozambique, Mount Lico and Mount Socone, are presented. A total of 19 species of amphibians (two orders, eight families, and 11 genera) and 21 species of reptiles (two orders, 11 families, and 17 genera) were recorded. Mount Lico is a unique site with representatives of both moist evergreen forest and miombo woodland herpetofaunal species. Noteworthy records for Mount Lico include an undescribed species of *Arthroleptis*, and a *Lygodactylus* that either represents a range extension of *L. regulus* or an undescribed species. Similarly, the *Nothophryne* found at the base of Mount Lico either represents a range extension of *N. baylissi* or an undescribed species. The finding of a *Mertensophryne* from the base of Mount Lico is reported and taxonomic confusion between *M. anotis* and *M. loveridgei* is highlighted. The findings presented here show that Mount Socone has a similar herpetofaunal composition to Mount Namuli, including the Pygmy Chameleon, *Rhampholeon tilburyi*, which was previously thought to be restricted to the latter mountain. A new species of *Breviceps* was found on Mount Socone, and the record of *Arthroleptis* aff. *francei* represents either a range extension for *A. francei* or an undescribed species. This survey provides a small but important contribution to the knowledge of Mozambican herpetofauna and biodiversity in general.**

Keywords. Africa, Amphibia, barcode, biodiversity, montane forest, herpetofauna, Reptilia

***Resumo*.—Apresentamos os primeiros levantamentos herpetológicos de duas montanhas no norte de Moçambique, o Monte Lico e o Socone. Registamos um total de 19 espécies de anfíbios (duas ordens, oito famílias e 11 gêneros) e 21 espécies de répteis (duas ordens, 11 famílias e 17 gêneros). O Monte Lico é um local único, com representantes de herpetofauna de florestas húmidas e de miombo. Registos importantes para o Monte Lico incluem uma espécie não descrita de *Arthroleptis*, um *Lygodactylus* que representa uma extensão da distribuição de *L. regulus* ou uma espécie não descrita. Da mesma forma, o *Nothophryne* encontrado na base do Monte Lico representa uma extensão da distribuição de *N. baylissi* ou uma espécie não descrita. Nós relatamos a descoberta de um *Mertensophryne* da base do Monte Lico e destacamos a confusão taxonômica entre *M. anotis* e *M. loveridgei*. Nossas descobertas mostram que o Monte Socone tem uma composição de herpetofauna semelhante ao Monte Namuli, incluindo o camaleão-pigmeu *Rhampholeon tilburyi*, que antes se pensava estar restrito à última montanha. Uma nova espécie de *Breviceps* foi encontrada no Monte Socone, e o registo de *Arthroleptis* aff. *francei* representa uma extensão de distribuição para *A. francei* ou uma espécie não descrita. Esta é uma pequena mas importante contribuição para o conhecimento da herpetofauna moçambicana e da biodiversidade em geral.**

Palavras chave. Africa, Amphibia, código de barras, biodiversidade, floresta montana, herpetofauna, Reptilia

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Introduction

Northern Mozambique, defined as the region north of the Zambezi River and south of the Ruvuma River, used to be one of the most unexplored regions in south/central Africa in terms of biodiversity, especially herpetofauna (Poynton and Broadley 1991; Tolley et al. 2016). Hundreds of scientifically unexplored mountains and inselbergs are scattered across the landscape of northern Mozambique. The growth of biodiversity knowledge of Mozambique has been hindered by the long-lasting Mozambican civil war (1977–1992) and its aftermath,

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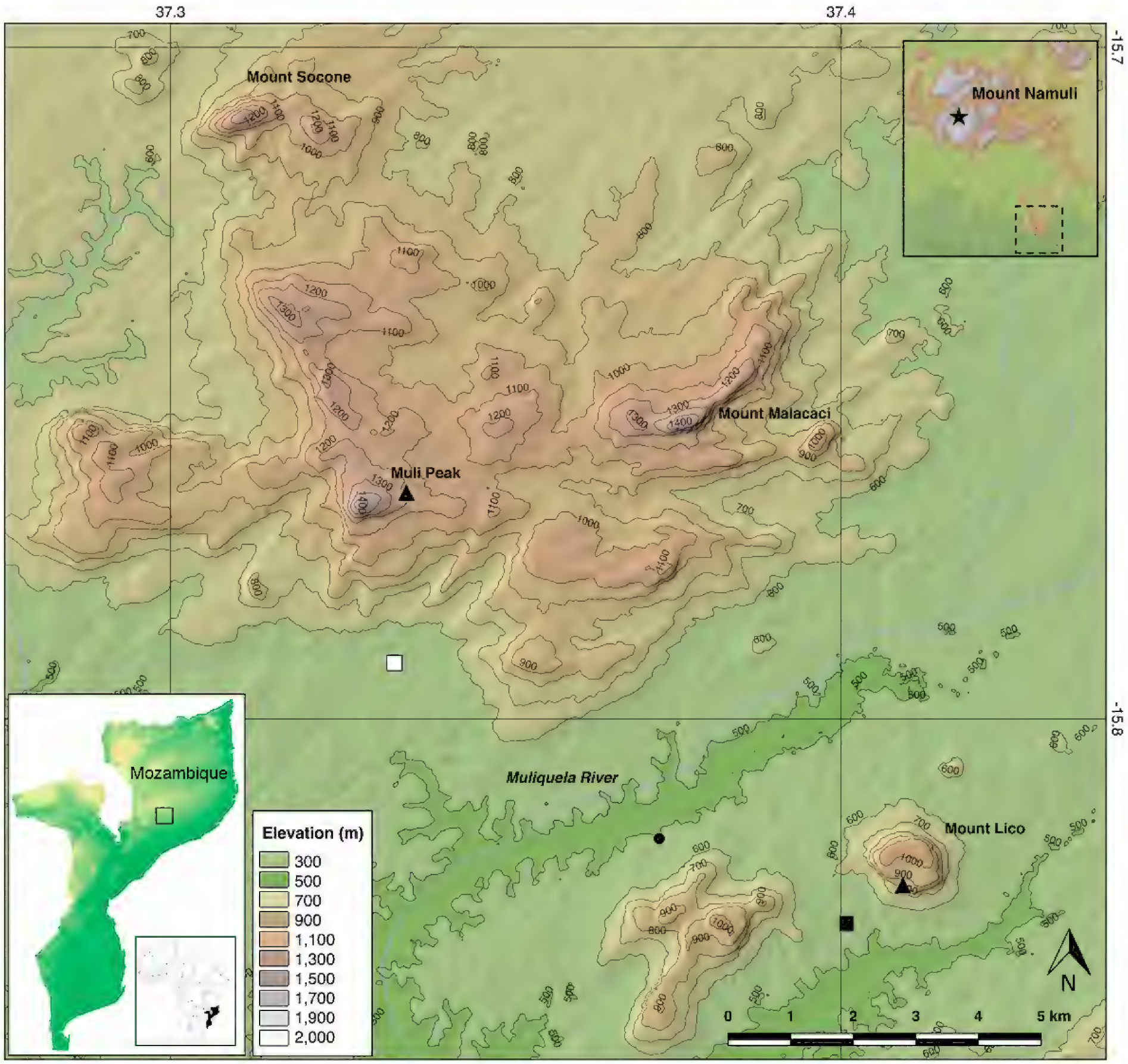

Fig. 1. Map of the study area. Top right inset box shows the location of the study area (smaller dashed box) in relation to Mount Namuli. Black triangles: locations of campsites on top of each mountain; black square: campsite at the base of Mount Lico; white square: Chá Socone Tea Factory; black circle: Muliquela River crossing. Map created using ALOS PALSAR data (ASF DAAC 2020).

and the country was not declared free of landmines until 2015. Several recent scientific expeditions to northern Mozambique have resulted in a substantial increase in the knowledge of the fauna and flora of this region (e.g., Bayliss et al. 2010, 2014; Branch et al. 2005a; Conradie et al. 2016; Farooq et al. 2015; Jones et al. 2020; Ohler and Frétey 2015; Portik et al. 2013a; Timberlake et al. 2009) and the discovery of new taxa (e.g., Bayliss et al. 2019; Branch et al. 2005b, 2019a; Branch and Tolley 2010; Conradie et al. 2018; Daniels and Bayliss 2012; Monadjem et al. 2010; Verburgt et al. 2018).

Herein we report the results from a recent multidisciplinary expedition to two scientifically unexplored mountains in the Zambezia Province of Mozambique, Mount Lico and Mount Socone, and present the first herpetological species report for these mountains and their surroundings.

Material and Methods

Study Area

The study area is in the Ile District, Zambezia Province, northern Mozambique (Fig. 1, Table 1) where the average elevation surrounding the mountains mentioned here is 400–500 m asl. For two nearby localities (Alto Molócuè at ca. 40 km NE and Gurué at ca. 40 km NW of the study area), data are available for the average (1,374 mm and 1,913 mm), maximum (2,036 mm and 2,535 mm), and minimum (1,007 mm and 1,134 mm) annual precipitation (Westerink 1996). Mount Lico (Fig.

Table 1. Geographical coordinates and vegetation types of the study area located in the Ile District of the Zambezia Province, northern Mozambique. Datum WGS-84.

Locality	Latitude	Longitude	Elevation (m)	Vegetation type
Mt. Lico (base)	-15.80063	37.35399	540	*Miombo* woodland, dry forest, *Eucalyptus* plantation, *mashamba* (local name for cultivation plot)
Mt. Lico (top)	-15.79406	37.36292	900	Evergreen forest
Mt. Socone (base)	-15.76172	37.28619	570	Tea plantation, dry forest
Mt. Socone (top)	-15.73623	37.28815	1,390	Montane forest
Muliquela River crossing	-15.78778	37.32583	520	*Miombo* woodland

2A–B) is a small inselberg with a maximum elevation of ca. 1,000 m asl. The mountain has steep granitic walls scattered with small bushes and grass tuffs growing from cracks on the rock face. Water seepages originate on top of the mountain and drain eastwards. The main vegetation cover, restricted to the top of the mountain, is dry when compared to the classic montane moist forest from East Africa. The vegetation is predominantly wet forest species dominated by *Macaranga capensis*, *Psychotria zombamontana*, *Erythroxylum emarginatum,* and *Newtonia buchananii*, with elements of woodland on the western side dominated by miombo species such as *Brachystegia spiciformis*. The central part of the mountain is characterized by dense evergreen thicket-like vegetation with lianas (H. Matimele, J. Osborne, J. Timberlake, pers. comm.). The only spring found at the top forms a small permanent stream that runs throughout the year for about 200 m before seeping down the mountain wall. Miombo woodland and *Eucalyptus* plantations dominate the area around Mount Lico, while the foothills are covered with dry forest. Access to the top was only possible through the assistance of professional climbers who set up a system of ropes and ascenders. Two campsites were established, one at the base and one on top of this mountain (Fig. 1).

The other surveyed site is a considerably larger and higher mountain block composed of three parts (Fig. 1): Mount Socone, Mount Malacaci, and Muli Peak. Even though the top campsite was located closer to Muli Peak (Fig. 2C–D), the local name for the whole mountain block is Mount Socone. Hence, hereafter the latter name is used to refer to this mountain. The south and west foothills

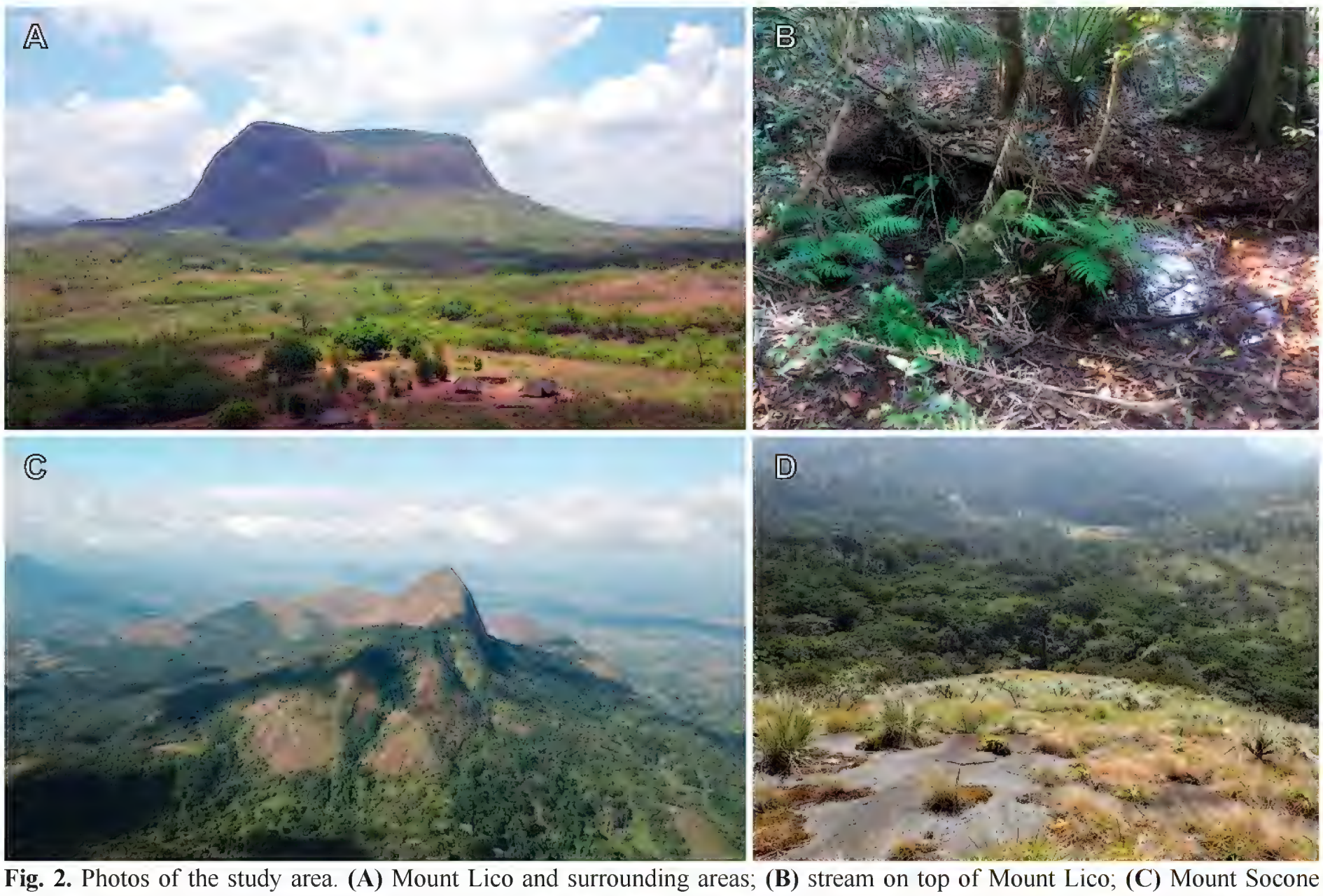

Fig. 2. Photos of the study area. **(A)** Mount Lico and surrounding areas; **(B)** stream on top of Mount Lico; **(C)** Mount Socone (mountain block) viewed from the East; **(D)** View from the summit of Muli Peak. *Photos: J. Bayliss (A–C) and G. Bittencourt-Silva (D).*

are surrounded by tea plantations (Chá Socone Factory) and miombo woodland. The mountain block comprises large patches of dense medium-altitude evergreen forest (at ca. 800–1,200 m asl), dominated by *Newtonia buchananii*, *Myrianthus holstii*, *Synsepalum passargei*, *Englerophytum magalismontanum*, and *Macaranga capensis* (H. Matimele, J. Osborne, J. Timberlake, pers. comm.); separated by areas with sparse vegetation and exposed granitic rocks. Vegetation near the summit is composed of patches of grasses and shrubs including species of *Gladiolus*, *Kniphofia*, *Xyris*, *Xerophyta*, and *Helichrysum* (H. Matimele, J. Osborne, J. Timberlake, pers. comm.). The campsite was situated near a small stream at around 1,160 m asl (see Fig. 1), where the forest is moist, dense, and tall.

Sampling sites include both the low and high elevations of the two mountains, referred to here as 'base' and 'top,' respectively. Opportunistic sampling was also conducted on the route between the two mountains at the crossing point of the Muliquela River (Table 1).

Data Collection

The survey was conducted during 13–22 May 2018, and a short follow-up visit by JB took place during 9–12 September 2019. The weather conditions during the initial 2018 survey were mostly dry, except for one night of rain on Mount Socone. Pitfall traps with drift fences, consisting of a line of 10 buckets placed every 5 m for a total length of 50 m, were set in each mountain and checked daily for three consecutive days. The traps were set in part to catch small mammals and herpetofauna. Diurnal and nocturnal visual encounter surveys were conducted on both mountains. Diurnal searches consisted of actively searching specific microhabitats (e.g., under logs and rocks, tree holes, water seepages, leaf litter), while nocturnal searches were conducted using head-torches or flashlights. Specimens were collected by hand, or by using nooses or elastic bands, and were temporarily placed in plastic or cloth bags until processed.

All specimens collected were euthanized with 20% lidocaine gel, after which liver or muscle samples were taken and preserved in 98% ethanol for genetic analysis. Specimens were initially preserved in 10% formalin and later transferred to 70–80% ethanol (or industrial methylated spirit) for permanent storage. Specimens are deposited in three collections: Museu de História Natural de Maputo in Mozambique (MHNM), Natural History Museum in the United Kingdom (BMNH), and Port Elizabeth Museum in South Africa (PEM).

Species Identification

Species were identified primarily based on external morphological characters as defined by field guides for Amphibia (Channing 2001; du Preez and Carruthers 2017; Poynton and Broadley 1985, 1987) and Reptilia (Branch 1998; Broadley 1990; Marais 2004; Spawls et al. 2018). In some instances, species identification was verified using DNA barcoding. Total genomic DNA was extracted using a Qiagen DNeasy kit following the manufacture's protocol for purification of total DNA from animal tissues. For amphibians and selected lizards, a fragment (ca. 500 bp) of the 16S rRNA gene was amplified using the primers 16S H3062 and 16SB FROG (modified from Palumbi et al. 1991). Polymerase chain reaction (PCR) was performed using Illustra PuReTaq Ready-To-Go PCR Beads for 35 cycles of 1 min with an annealing temperature of 51 °C. For snakes, a fragment of the mitochondrial cytochrome b gene was amplified using the primers WWF and Cytb-R2 (Whiting et al. 2003). Amplification was carried out using 20–50 ng/µL extracted genomic DNA. Each amplification was conducted in a final PCR mixture volume of 25 µL containing 12.5 µL TopTaq Mastermix (Qiagen), 2 µL forward primer (10 µM), 2 µL reverse primer (10 µM), and 8.5 µL of the genomic DNA and de-nucleated water combined. The cycling profile was conducted as follows: initial denaturing step at 94 °C for 5 min, followed by 35–40 cycles of 94 °C for 30 s, 52–54 °C for 45 s, and 72 °C for 45 s, with a final extension at 72 °C for 8 min. DNA extractions and PCRs were performed at the Natural History Museum (NHM, United Kingdom) and Rhodes University (South Africa). Single strand sequencing reactions and electrophoresis were carried out by the molecular lab teams at the NHM (United Kingdom) and at Macrogen Inc. (South Korea or The Netherlands). Sequences were trimmed in Geneious 7 (Kearse et al. 2012) using *maximum low-quality bases* as 20. The Basic Local Alignment Search Tool (BLAST; Altschul et al. 1990) was used to identify the closest matches for each sequence on the GenBank repository. Sequences generated in this study are available on GenBank and their accession numbers are available in the **Supplementary Material** (Table S1, available at DOI: http://dx.doi.org/10.6084/m9.figshare.12251258).

Results

A total of 19 amphibian species (two orders, eight families, and 11 genera) and 21 reptile species (two orders, 11 families, and 17 genera) were recorded during the surveys (Tables 2–3).

Species Accounts

Information on the voucher numbers and broad sampling localities for each species is provided here. A complete species list, including vouchers, GenBank accession numbers, collecting locality, and exact coordinates, is presented in Table S1. Brief notes on identification, taxonomy, and/or natural history are also provided when appropriate.

Table 2. List of amphibians found at Mounts Lico and Socone (and surrounding areas), northern Mozambique. Specimens were collected at the base (B) and/or on top (T) of each mountain.

ORDER/Family	Species	Mt. Lico	Mt. Socone
ANURA			
Arthroleptidae	*Arthroleptis* aff. *francei*	-	T
	Arthroleptis sp.	T	-
	Arthroleptis stenodactylus	B/T	B
	Arthroleptis xenodactyloides	B/T	B/T
	Leptopelis broadleyi	B	-
	Leptopelis flavomaculatus	-	T
Brevicipitidae	*Breviceps mossambicus*	T	-
	Breviceps sp.	-	T
Bufonidae	*Mertensophryne* cf. *loveridgei*	B	-
	Sclerophrys gutturalis	B/T	-
	Sclerophrys pusilla	B	-
Hemisotidae	*Hemisus marmoratus*	-	B
Hyperoliidae	*Hyperolius marmoratus albofasciatus*	B	-
	Hyperolius substriatus	B/T	T
	Hyperolius tuberilinguis	T	B
Phrynobatrachidae	*Phrynobatrachus mababiensis*	B	-
Pyxicephalidae	*Amietia delalandii*	B	-
	Nothophryne sp.	B	-
GYMNOPHIONA			
Scolecomorphidae	*Scolecomorphus kirkii*	-	T
TOTAL (Base/Top)		**14 (11/7)**	**9 (4/6)**

Amphibia

Order Anura
Arthroleptidae

Arthroleptis aff. *francei* Loveridge, 1953
France's Squeaker

Material. MOUNT SOCONE (top): BMNH 2018.2466. **Identification.** This single specimen (Fig. 3A) morphologically resembles *A. francei* in having a relatively small inner metatarsal tubercle; swollen toe tips; and a dark brown band from canthus rostralis, continuing as a broader supratympanic band extending posteroventrally and terminating just dorsal of the arm. The BLAST search confirms the affinity with *A. francei* from Malawi (96% sequence similarity; FJ151100). **Comments.** *Arthroleptis francei* is listed as Vulnerable (IUCN SSC Amphibian Specialist Group and South African Frog Re-assessment Group 2016) because it is only known from three threat-defined locations. This species likely represents a species complex that occurs in montane regions of Malawi and northern Mozambique (see photo in Conradie et al. 2016). A review of these populations is crucial to more accurately assess the taxonomic and conservation statuses of *A. francei*.

Arthroleptis sp.
Squeaker

Material. MOUNT LICO (top): BMNH 2018.2467–68. **Identification.** This is a small *Arthroleptis* with a slender body (Fig. 3B) and, although not very distinct, it has the typical three-lobed pattern on the back (generic distinction). It is found in sympatry with *A. stenodactylus* and *A. xenodactyloides* but can be distinguished based on the following combination of characters: inner metatarsal tubercle very reduced (large in *A. stenodactylus* and inconspicuous in *A. xenodactyloides*), and tips of toes slightly swollen (but finger tips not swollen as in *A. xenodactyloides*). Overall, this form morphologically resembles *A. troglodytes* Poynton, 1963, a rather small saxicolous species only known from the Chimanimani mountain range, on the border between Mozambique and Zimbabwe (Becker and Hopkins 2017). The BLAST search shows 93% sequence similarity with *A. francei* from Malawi (FJ151100), but there are no sequences of *A. troglodytes* available for comparison. **Comments.** Based on morphological examination and preliminary

Fig. 3. Amphibians from Mount Lico and Mount Socone, northern Mozambique. **(A)** *Arthroleptis* aff. *francei*; **(B)** *Arthroleptis* sp.; **(C)** *A. stenodactylus* (mountain form); **(D)** *A. stenodactylus* (lowland form); **(E)** *A. xenodactyloides*; **(F)** *Leptopelis broadleyi*; **(G)** *L. flavomaculatus*; **(H)** *Breviceps* sp.; **(I)** *Mertensophryne* cf. *loveridgei*; **(J)** *Sclerophrys gutturalis*; **(K)** *Hemisus marmoratus*; **(L)** *Hyperolius marmoratus albofasciatus*; **(M–O)** *H. substriatus*; **(P)** *H. tuberilinguis*; **(Q)** *Nothophryne* sp.; **(R)** *Scolecomorphus kirkii*.

analysis of molecular data (not shown here), this likely represents a new species, which is also found on Mount Chiperone (ca. 190 km southwest of Mount Lico).

Arthroleptis stenodactylus Pfeffer, 1893
Shovel-footed Squeaker

Material. MOUNT LICO (base): BMNH 2018.2480; **MOUNT LICO (top):** BMNH 2018.2469–79, PEM A13716–21, PEM A13730, PEM A13735, MHNM: WC-6475; **MOUNT SOCONE (base):** BMNH 2018.2481. **Identification.** Two forms were identified (see **Comments**). The form (abundantly) found on top of Mount Lico (Fig. 3C) differs from the lowland form found at the bases of Mounts Lico and Socone in having a dusky venter (especially the pectoral area), whereas the latter is immaculate (Fig. 3D). All specimens have well-developed inner metatarsal tubercles, a dark band from the tip of the snout to the eye, continuing from the posterior corner of the eye towards the arm insertion but not reaching it. The BLAST results indicate that the lowland/woodland form is 100% similar to *A. stenodactylus* from Malawi (FJ151098–99), whereas the mountain/forest form is 98% similar to *A. stenodactylus* from Tanzania (KY177077). Sequence similarity between the mountain/forest form from Mount Lico and the lowland/woodland from Malawi (FJ151098–99) is 92%. The uncorrected pairwise distance between the 16S sequences of samples collected on top of Mount Lico and the samples collected at the base of the two mountains is 8%. **Comments.** According to the literature (see Loveridge 1953, p. 389; Pickersgill 2007, p. 305) and personal experience (GBBS), there are at least two forms currently being assigned to this name, a mountain/forest form and a lowland/woodland and savannah form. Differences between the montane and lowland forms of *Arthroleptis stenodactylus* have been observed in other areas in Mozambique (GBBS, pers. obs.). Remains of a spider (possibly *Gasteracantha*) were found in the stomach contents of one specimen from Mount Lico.

Arthroleptis xenodactyloides Hewitt, 1933
Dwarf Squeaker

Material. MOUNT LICO (base): BMNH 2018.2486–87, BMNH 2018.2490, PEM A13707–08, PEM A13714, MHNM: WC-6395; **MOUNT LICO (top):** BMNH 2018.2482–85, BMNH 2018.2488–89, PEM A13722–24, PEM A13727–29, MHNM: WC-6467, WC-6469, WC-6471–74, WC-6476; **MOUNT SOCONE (base):** BMNH 2018.2493–94, PEM A13709–10; **MOUNT SOCONE (top):** BMNH 2018.2491–92, PEM A13732, MHNM: WC-6441. **Identification.** Specimens were first identified based on male calls (a short high-pitched cricket-like chirp) and a combination of the following characters: small size, inconspicuous inner metatarsal tubercle, and swollen toe tips (Fig. 3E). **Comments.** This species is very common in the leaf litter on top of Mount Lico.

Leptopelis broadleyi Poynton, 1985
Broadley's Tree Frog

Material. MOUNT LICO (base): BMNH 2018.2495 (Fig. 3F). **Identification.** Dorsal color pattern light brown with isolated darker spots, a dark interorbital triangle with the apex pointing backwards and an inverted "Y" on the dorsum. A broad, pale line is present on the femur, above the vent, and on the outer surfaces of the tarsus and feet. **Comments.** Schiøtz (1975) renamed Poynton's *L. concolor* as *L. argenteus meridionalis*. However, as the name *meridionalis* was preoccupied, Poynton (1985) renamed the species *L. broadleyi* in recognition of Dr. D.G. Broadley's note on the differences in call between this species and *L. mossambicus*. There has been some uncertainty regarding the validity of *L. broadleyi* (see Ohler and Frétey 2015, p. 79–80). For further discussion about the taxonomy of this species see **Comments** under *Leptopelis argenteus* in Frost (2020). This specimen was found in dry leaf litter close to a marshy area on the way to the climbing point of Mount Lico.

Leptopelis flavomaculatus (Günther, 1864)
Yellow-spotted Tree Frog

Material. MOUNT SOCONE (top): BMNH 2018.2496–97, PEM A13733. **Identification.** Specimens were identified based on the well-developed discs on the toes and fingers and moderate webbing. Some specimens still show green spots suggesting that they are young adults. A juvenile specimen showing the uniform green with yellow spots pattern was also collected. **Comments.** Individuals were found at night sitting on vegetation near a stream (Fig. 3G). No males were heard calling.

Brevicipitidae

Breviceps mossambicus Peters, 1854
Mozambique Rain Frog

Material. MOUNT LICO (top): BMNH 2018.2498–2500, PEM A13725–26, MHNM: WC-6468. **Identification.** All specimens conform to the typical *B. mossambicus* from elsewhere in Mozambique based on the combination of the following: conspicuous facial mask, inner and outer metatarsal tubercles separated, no pale paravertebral or dorsolateral patches/blotches, uniformly dark dorsum, and no white mark above vent. **Comments.** All specimens were caught in pitfall traps. Although this species was only recorded on top of Mount Lico, it is likely to also occur around the foothills and surrounding areas.

Breviceps sp.

Material. MOUNT SOCONE (top): BMNH 2018.2501. **Identification.** Although this specimen is molecularly very similar to *Breviceps mossambicus* from Mount Lico (98% sequence similarity), they differ in coloration, skin texture, and morphology (Fig. 3H). The venter is white with dark vermiculation; dorsum dark brown, coarsely granular, with lighter brown coloration separating the granules; a yellowish (rather than white) band over the mouth, pointing downwards; a yellow band extending from the posterior border of the eye to the anterior insertion of the arm; yellow blotches on the flanks; the "neck" region is elongated; and the toes and fingers are relatively long. Poynton (1964) and Poynton and Pritchard (1976) discuss the role of digit reduction in *Breviceps* as an adaptation to living in savannah, while the ancestral state is considered to be a forest form. **Comments.** The specimen was collected in a pitfall trap. This form represents a new species and is currently being described.

Bufonidae

Mertensophryne cf. *loveridgei* (Poynton, 1991)
Loveridge's Forest Toad

Material. MOUNT LICO (base): BMNH 2018.2502 (Fig. 3I). **Identification.** The identification is based on the following combination of morphological characters: vent pointing downwards, parotid glands broad and flattened, skin covered with spines, tympanum hidden, ventral surface with a single elongated dark fleck in the anterior pectoral region, and well defined dorsal v-shaped markings (Poynton 1977). The closest match on GenBank is "*M. anotis*" from Taratibu in northeastern Mozambique (99% sequence similarity; KY555643). However, prior to the discovery of the Taratibu specimen, *M. anotis* was only known from southeastern Zimbabwe and adjoining Mozambique (Farooq et al. 2015), whereas *M. loveridgei* is known to occur in southeastern Tanzania (Poynton 1977), which is much closer to Taratibu. Importantly, sequences from the Mount Lico specimen are equally similar (98%) to *M. anotis* from the type locality (AF220910) and to *M. loveridgei* from Tanzania (FJ882820); and it is plausible that the GenBank accession for "*M. anotis*" from Taratibu is actually *M. loveridgei*. Further investigation is needed to resolve the taxonomic identities of recently collected specimens and the relationship of the two described species. **Comments.** This specimen was found on the trail leading to the climbing point at 690 m asl. Rasplus et al. (2009) reported two species of *Mertensophryne* for Cabo Delgado Province in north-eastern Mozambique, *M. loveridgei* (Poynton, 1991) and *M. micranotis* (Loveridge, 1925). The former species was only known from southern Tanzania, whereas the latter extends northwards into Kenya. Unfortunately, the specimens escaped before they could be preserved, and species determination was done by Professor Kim Howell (presumably) based on photographs (Rasplus et al. 2009). The finding here represents either the southernmost record of *M. loveridgei* or another relictual population of *M. anotis* in northern Mozambique.

Sclerophrys gutturalis (Power, 1927)
Guttural Toad

Material. MOUNT LICO (base): BMNH 2018.2503, BMNH 2018.2538, PEM A13665, PEM A13704–05, MHNM.Amp.2018.0028; **MOUNT LICO (top):** BMNH 2018.2541. **Identification.** This species is very similar to *S. pusilla* (see below) but can be distinguished by the elevated parotid glands and red markings behind the thighs, although these characters can be variable and/or difficult to distinguish in juveniles. The BLAST search shows > 99% sequence similarity with a large number of sequences of *S. gutturalis*. **Comments.** Abundantly found around the campsite where some individuals were found hiding under tents or near the stream at night (Fig. 3J). Whether this species is breeding on top of Mount Lico is unclear given that only two individuals were found there (only one was collected) and that the only water body found there is a small spring that runs for less than 200 m before dropping down the mountain. *Sclerophrys pusilla* usually breeds in lentic water bodies. Additionally, the DNA samples of *S. gutturalis* obtained here, two from the base and one from the top of Mount Lico, show 100% sequence similarity.

Sclerophrys pusilla (Mertens, 1937)
Southern Flat-backed Toad

Material. MOUNT LICO (base): BMNH 2018.2539–40, PEM A13690, PEM A13706, MHNM.Amp.2018.0001. **Identification.** In these specimens, the parotid glands are flattened and there are no red markings on the posterior surfaces of the thighs. The BLAST search shows > 99% sequence similarity with a large number of sequences of *S. pusilla*. **Comments.** Similar to the previous species, this toad was abundant around the campsite at the base of Mount Lico.

Hemisotidae

Hemisus marmoratus Rapp, 1842
Mottled Shovel-nosed Frog

Material. MOUNT SOCONE (base): BMNH 2018.2542 (Fig. 3K). **Identification.** This species has a hard, protruding snout which is used for digging, and the dorsum is finely mottled and has a fine pale vertebral line. **Comments.** The specimen was found by raking through leaf litter around mango trees on the edge of dry lowland

forest at the Chá Socone tea factory.

Hyperoliidae

Hyperolius marmoratus albofasciatus Hoffman, 1944
Marbled Reed Frog

Material. MOUNT LICO (base): BMNH 2018.2543–45, PEM A13700. **Identification.** The population from Mount Lico fits the following description of *H. marmoratus albofasciatus* by Poynton and Broadley (1987, p. 226): "Characteristic pattern a white or yellow mid-dorsal band, with no central red line; rest of back black. Sides same color as dorsal band, but with a row of black blotches. Variation includes irregularities of the dorsal band and projections from the light lateral area over the back. No lateral subdermal darkening." Loveridge (1953) considered this taxon to be a subspecies of *Hyperolius marmoratus*. Later, Wieczorek et al. (2000, 2001) considered it to be a junior synonym of *H. marginatus* despite, and without comment upon, their markedly distinct color patterns (see Poynton and Broadley 1987). This synonymy was rejected by Pickersgill (2007), although Frost (2020) considers it to be a subspecies of *H. marginatus*. To add to the confusion, the BLAST search shows 100% similarity with *H. swynnertoni* (MK509601) from Gorongosa National Park, central Mozambique (see Portik et al. 2019). *Hyperolius swynnertoni* FitzSimons, 1941 currently includes a junior synonym, *H. marmoratus broadleyi* (*sensu* Poynton, 1963), which differs from *H. albofasciatus* by (usually) having a red line in the center of the light bands. Du Preez and Carruthers (2017) indicate that *Hyperolius swynnertoni broadleyi* form is restricted to the Chimanimani Mountains and therefore does not occur in Gorongosa National Park. However, Poynton and Broadley (1987) recorded "*H. marmoratus broadleyi*" from Gorongosa Mountain, which is corroborated by Portik et al. (2019). A taxonomic review of the *H. marmoratus* group is long overdue. **Comments.** Specimens were found at night on marginal vegetation along the stream near the campsite (Fig. 3L).

Hyperolius substriatus Ahl, 1931
East Africa Reed Frog

Material. MOUNT LICO (base): BMNH 2018.2546–48, PEM A13701–03; **MOUNT LICO (top):** BMNH 2018.2561; **MOUNT SOCONE (top):** BMNH 2018.2549–50, PEM A13731, MHNM: WC-6420. **Identification.** Despite showing a great variety of color patterns (Fig. 3M–O), this species could be identified based on the following combination of characters: light band on canthus, extending over upper eyelid usually beyond arm insertion; pupil horizontal; discs on fingers and toes usually reddish. The GenBank BLAST search shows 100% sequence similarity with *H. substriatus* from the base of Mount Namuli, Mozambique (MK509637). **Comments.** Specimens were found at night calling close to streams.

Hyperolius tuberilinguis Smith, 1849
Tinker Reed Frog

Material. MOUNT LICO (top): BMNH 2018.2562; **MOUNT SOCONE (base):** BMNH 2018.2551, PEM A13711–12. **Identification.** All specimens had a dull cream coloration with a slightly darker backward-pointing triangle on the dorsum before preservation (Fig. 3P). DNA barcoding was used to confirm the species identification and a GenBank BLAST search shows 100% sequence similarity with *H. tuberilinguis* from Malawi (MK509598). **Comments.** Specimens from Mount Socone were found while raking through dried mango leaves at the Chá Socone tea factory, and the specimen from Mount Lico was found near the small stream that runs through the center of the basin forest. During the breeding season, this species is known to have uniform green or yellow coloration.

Phrynobatrachidae

Phrynobatrachus mababiensis FitzSimons, 1932
Dwarf Puddle Frog

Material. MOUNT LICO (base): BMNH 2018.2552. **Identification.** This species is very similar to the sympatric *Nothophryne* sp. but differs in having a slender body, the underside speckled grey (not white as in *Nothophryne*), and the presence of a tarsal tubercle. **Comments.** A single juvenile was found just before dusk on the trail to the climbing point of Mount Lico. *Phrynobatrachus mababiensis* is a species complex widely distributed across sub-Saharan Africa (Zimkus and Schick 2010).

Pyxicephalidae

Amietia delalandii (Duméril and Bibron, 1841)
Delalande's River Frog

Material. MOUNT LICO (base): BMNH 2018.2553–55, PEM A13569–71, MHNM: WC-6384. **Identification.** These specimens were readily identified by their large body (> 70 mm), white immaculate venter, narrow head, and by having up to three phalanges of the 4th toe free of web. The closest match on GenBank (100% similarity) is *A. delalandii* from Malawi (KU693773). Channing et al. (2016) recently resurrected this taxon from the synonymy of *Amietia quecketti*. **Comments.** The specimens were found at night in or on the margins of the stream near the campsite.

Nothophryne sp.
Mongrel Frog

Material. MOUNT LICO (base): BMNH 2018.2556–58, PEM A13713, PEM A13715, MHNM: WC-6477. **Identification.** Given their relatively small sizes, these specimens appear to be sub-adults (Fig. 3Q). They were identified based on the presence of large warts on the dorsum, white venter, unpigmented under thighs, swollen toe tips, and no tarsal tubercle. These specimens also show typical markings observed in all other *Nothophryne* species (although not reported in the original descriptions): a light patch below the *canthus rostralis*, bordered dorsally by a dark brown band; and a light mark pointing downwards from the corner of the mouth towards the arm insertion. Four new species of mongrel frogs have recently been described from four inselbergs of northern Mozambique (Conradie et al. 2018). These species are geographically and genetically isolated, though they are morphologically highly conserved. The Mount Lico population could represent yet another new species, but further investigation should be conducted and more evidence should be gathered before any conclusions are drawn. **Comments.** These frogs were found on granitic slopes where water seeps down the mountain near our climbing point. *Nothophryne* is likely to occur on Mount Socone.

Order Gymnophiona

Scolecomorphidae

Scolecomorphus kirkii Boulenger, 1883
Kirk's Caecilian

Material. MOUNT SOCONE (top): BMNH 2018.2559–60, PEM A13734. **Identification.** Specimens were identified as belonging to the genus *Scolecomorphus* on the basis of their relatively large tentacles, which are situated closer to the nostril than to the eye socket, and having only primary annuli (Fig. 3R), and specifically as *S. kirkii* because the dark dorsal coloration covers more than half the body (Nussbaum 1985). **Comments.** Two of the specimens were found active on the surface around the camp shortly after the tent sites were cleared, while the third specimen was found in one of the pitfall traps after a night of heavy rain. *Scolecomorphus* is an East African caecilian genus also found in Tanzania and Malawi (Poynton and Broadley 1985) and on other mountains in northern Mozambique (Conradie et al. 2016), and it may occur as far south as the Chimanimani Mountains in Zimbabwe (see Loveridge 1953, p. 333).

Class Reptilia

Order Squamata – Sauria
Agamidae

Agama kirkii Boulenger, 1885
Kirk's Rock Agama

Material. MOUNT SOCONE (base): BMNH 2019.2895, PEM R23942–43, MHNM: WC-6414. **Identification.** This species is sympatric with *Agama mossambica* (below) but can easily be distinguished by a combination of the following characters: head of male orange, throat orange, and dorsum greyish to purple with white, dark-edged blotches (Fig. 4A). The closest match on GenBank is *Agama kirkii* from Mount Namuli in northern Mozambique (99% sequence similarity; JX668184). **Comments.** This species is common around villages and buildings at the Chá Socone tea factory. Some individuals were observed running on the granitic slopes of Mount Socone in sympatry with *Trachylepis margaritifera*.

Agama mossambica Peters, 1854
Mozambique Agama

Material. MULIQUELA RIVER CROSSING: BMNH 2019.2898; **MOUNT LICO (base):** PEM R23936; **MOUNT SOCONE (base):** BMNH 2019.2896–97, PEM R23944–45. **Identification.** Males have blue heads, dark throats, and dorsum with mid-dorsal paired darker dashes (not blotches) along the vertebral crest (Fig. 4B). **Comments.** Found around the tea plantation and the edge of *Eucalyptus* plantations. Individuals were observed basking in open areas.

Chamaeleonidae

Chamaeleo dilepis Leach, 1819
Flap-neck Chameleon

Material. MOUNT SOCONE (base): MHNM. Rep.2018.0002. **Identification.** Currently eight subspecies are recognized within *C. dilepis* (Main et al. 2018). We assign this specimen (Fig. 4C) to the typical race based on the presence of large moveable occipital lobes (Tilbury 2018) and sequence similarity with *C. d. dilepis* from northern Mozambique (98% sequence similarity; DQ923816). **Comments.** Local villagers brought two additional individuals to the campsite at the base of Mount Lico that were identified and subsequently released.

Rhampholeon tilburyi Branch, Bayliss, and Tolley, 2014
Mount Namuli Pygmy Chameleon

Material. MOUNT SOCONE (top): BMNH: WC-6418, WC-6428, WC-6430–32, WC-6436, PEM R24237–43, MHNM.Rep.2018.0008. **Identification.** Recently, Branch et al. (2014) described four new species of pygmy chameleons that are endemic to northern Mozambique montane forests, and Conradie et

Table 3. List of reptiles found at Mounts Lico and Socone (and surrounding areas), northern Mozambique. Specimens were collected at the base (B) and/or on top (T) of each mountain. *Species observed/photographed but not collected; **Specimen collected at the Muliquela River crossing.

ORDER/Family	Species	Mt. Lico	Mt. Socone
SQUAMATA			
Agamidae	*Agama kirkii*	-	B
	Agama mossambica	B	B**
Chamaeleonidae	*Chamaeleo dilepis*	B*	B
	Rhampholeon tilburyi	-	T
	Trioceros melleri	-	B
Cordylidae	*Platysaurus maculatus*	B	
Gekkonidae	*Hemidactylus mabouia*	B	B
	Lygodactylus capensis	-	B
	Lygodactylus sp.	T	-
Scincidae	*Melanoseps ater*	-	T
	Panaspis aff. *maculicollis*	B	-
	Trachylepis margaritifera	T*	B/T*
	Trachylepis varia	B	B*
Colubridae	*Dasypeltis scabra*	B	-
	Philothamnus macrops	T	-
Elapidae	*Naja subfulva*	B	-
Lamprophiidae	*Boaedon fuliginosus*	B	-
	Lycophidion capense	B	-
Typhlopidae	*Afrotyphlops mucruso*	B	-
Viperidae	*Bitis arietans*	B	-
CHELONIA			
Testudinidae	*Kinixys zombiensis*	B*	-
TOTAL (Base/Top)		**16 (13/3)**	**10 (8/3)**

al. (2016) alluded to further overlooked cryptic diversity. Most species of *Rhampholeon* are morphologically very conservative and difficult to distinguish (Branch et al. 2014). The closest match on GenBank is *R. tilburyi* from Mount Namuli (98% sequence similarity; AM055681). This species was known to occur only on Mount Namuli, located 40 km northeast of Mount Socone. *Rhampholeon tilburyi* is a forest specialist, which suggests that in the past the forests of Mount Socone and Mount Namuli were probably connected. **Comments.** These pygmy chameleons were found 1–2 m above the ground, sleeping on low vegetation around the campsite at Mount Socone (Fig. 4D).

Trioceros melleri (Gray, 1865)
Meller's Chameleon

Material. MOUNT SOCONE (base): Photograph Fig. 4E; DNA sample. **Identification.** This is the largest mainland species of chameleon and is characterized by having a single small annular rostral horn. The BLAST search shows 99% similarity with *T. melleri* from Malema River in northern Mozambique (DQ923813). **Comments.** This individual, collected by workers from the Chá Socone tea plantation, was photographed before having a DNA sample taken from the tail tip and then released. This is the only species of *Trioceros* known from Mozambique, whereas in adjacent Tanzania there are 15 species (Spawls et al. 2018).

Cordylidae

Platysaurus maculatus Broadley, 1965
Spotted Flat Lizard

Material. MOUNT LICO (base): BMNH 2019.2907, PEM R23951; **MOUNT LICO (top):** BMNH 2019.2906, PEM R23949. **Identification.** Specimens were identified as belonging to the genus *Platysaurus* on the basis of their relatively flattened bodies, and are referred to *P. maculatus* based on the presence of enlarged scales on the side of the neck, which differentiates them from *P. mitchelli* (Broadley 1965). *Platysaurus maculatus* is mostly restricted to northern Mozambique with an isolated population recorded from Masasi, southern Tanzania (Scott et al. 2004; Wegner et al. 2009). There are two subspecies, *P. m. maculatus* and *P. m. lineicauda*, and based on their geographic distributions,

Fig. 4. Reptiles from Mount Lico and Mount Socone, northern Mozambique. **(A)** *Agama kirkii*; **(B)** *A. mossambica*; **(C)** *Chamaeleo dilepis*; **(D)** *Rhampholeon tilburyi*; **(E)** *Trioceros melleri*; **(F)** *Platysaurus maculatus*; **(G)** *Lygodactylus* sp.; **(H)** *Melanoseps ater*; **(I)** *Panaspis* aff. *maculicollis*; **(J)** *Dasypeltis scabra*; **(K–L)** *Philothamnus macrops*; **(M–N)** *Naja subfulva*; **(O)** *Boaedon fuliginosus*.

these specimens (Fig. 4F) should belong to the nominal subspecies (Broadley 1965). These specimens also conform morphologically to *P. m. maculatus* in having six sublabials, the supranasals in broad contact, and the occipital absent. **Comments.** Specimens (only juveniles) were found on the granitic slopes of Mount Lico in sympatry with *Trachylepis margaritifera.*

Gekkonidae

Hemidactylus mabouia (Moreau De Jonnès, 1818)
Common Tropical House Gecko

Material. MOUNT LICO (base): BMNH 2019.2899; **MOUNT SOCONE (base):** PEM R23946. **Identification.** Two species of *Hemidactylus* are known to occur in northern Mozambique, *H. mabouia* and *H. platycephalus*. This material is assigned to the former based on a lower number of preanal pores, smaller body size, and narrow head. The closest match on GenBank is *H. mabouia* from Annobón, Equatorial Guinea (98% sequence similarity; AY863038). **Comments.** This specimen was found on a wall at the Chá Socone tea plantation.

Lygodactylus capensis (Smith, 1849)
Common Dwarf Gecko

Material. MOUNT SOCONE (base): PEM R23948. **Identification.** The specimen was identified as belonging to the genus *Lygodactylus* based on the presence of a rudimentary outer toe and large retractile claws, and as *L. capensis* on the basis of having a pale gray coloration (head and body), fine dark markings on the throat, and the presence of a lighter dorsolateral stripe. The closest match on GenBank is *L. capensis* from South Africa (98% sequence similarity; GU593438). **Comments.** This specimen was found on trees around the Chá Socone tea plantation. The *L. capensis* group is known to comprise a complex of undescribed species (Röll et al. 2010).

Lygodactylus sp.
Dwarf Gecko

Material. MOUNT LICO (top): PEM R25245–46. **Identification.** This is a relatively large gecko (largest individual measured 32.7 mm snout-vent length), and morphologically similar to *L. rex* from Malawi and *L. regulus* from Mount Namuli (Portik et al. 2013b) based on the presence of a large mental scale with shallow lateral fissures. However, these specimens lack the characteristic white ocellus above the shoulder (Fig. 4G). They resemble *L. regulus* in having three postmentals, smaller overall size, and duller dorsal coloration. Due to the close proximity to Mount Namuli (ca. 40 km) this could represent a range extension for *L. regulus*, similar to *Rhampholeon tilburyi* (see account above), or it may represent an undescribed species. **Comments.** These specimens were collected from palm trees around the camp during a second survey conducted by J. Bayliss in September 2019.

Scincidae

Melanoseps ater (Günther, 1873)
Black Limbless Skink

Material. MOUNT SOCONE (top): BMNH 2019.2900–01, PEM R23952–53, MHNM: WC-6437. **Identification.** This forest-dependent species occurs in other Mozambican mountains (Conradie et al. 2016) and its taxonomy is still unresolved. We tentatively assign our specimens to *M. ater* on the basis of having 23–24 mid-body scale rows, 153–154 ventrals, 45–47 subcaudals, and having been found in forest (*fide* Broadley et al. 2006). **Comments.** Found in forest under logs (Fig. 4H).

Panaspis aff. *maculicollis* Jacobsen and Broadley, 2000
Spotted-neck Snake-eyed Skink

Material. MOUNT LICO (base): BMNH 2019.2902–05, PEM R23935, PEM R23937–40. **Identification.** These specimens lack the characteristic dorsolateral white line (Fig. 4I) of *P. wahlbergi*, and are thus assigned to the *P. maculicollis* group. A recent study by Medina et al. (2016) identified up to five genetically distinct and morphologically cryptic lineages from central and northern Mozambique. **Comments.** These small skinks are common in the *Eucalyptus* plantations and in leaf litter around mango trees.

Trachylepis margaritifera (Peters, 1854)
Rainbow Skink

Material. MOUNT SOCONE (base): BMNH 2019.2908, PEM R23947, MHNM.Rep.2018.0009. **Identification.** Underside of feet and toes mostly smooth. Males have dorsum olive to brown with white specks; tail yellow to orange. Juveniles and females have dorsum dark brown with pale yellow to bronze stripes; tail bright blue. **Comments.** This species is common around human settlements and on the granite slopes of Mount Socone.

Trachylepis varia (Peters, 1867)
Variable Skink

Material. MOUNT LICO (base): PEM R23941. **Identification.** A small terrestrial skink with a bronze dorsum, especially anteriorly; dorsolateral white line extending from behind the eye to the groin. The *T. varia* group was recently revised and the northern Mozambique forms have been assigned to the typical form (Weinell and Bauer 2018). **Comments.** This species is commonly found in leaf litter in the surroundings of Mount Lico. Some individuals were observed along the trail to the forest on Mount Socone. Only one specimen was observed on top of Mount Lico, but it escaped in the dry leaf litter.

Order Squamata – Serpentes

Colubridae

Dasypeltis scabra (Linnaeus, 1758)
Common Egg Eater

Material. MOUNT LICO (surrounding area): Photograph: Fig. 4J. **Identification.** No specimens were collected and this record is based on one photograph that clearly shows a thin elongated body with keeled scales and numerous dark brown blotches flanked by narrow dark brown bars. **Comments.** This individual was killed by locals and photographed by a member of the film crew *en route* to Mount Lico in September 2019.

Philothamnus macrops (Boulenger, 1895)
Large-eyed Green Snake

Material. MOUNT LICO (top): PEM R23950 (Fig. 4K–L). **Identification.** This snake is easily distinguished from any other *Philothamnus* species occurring in Mozambique by having a lower number of midbody scale rows (13 versus the usual 15 in other species) and a divided anal scale (Branch et al. 2019b). The closest match on GenBank is *P. macrops* from Mount Mabu, Mozambique (98% sequence similarity; MH756442). **Comments.** Found active on the forest floor near a stream eating a leaf litter frog (*Arthroleptis* sp.). Branch et al. (2019b) provide a full historical overview of this species for Eastern Africa and discuss the first records for Mozambique.

Elapidae

Naja subfulva Laurent, 1955
Brown Forest Cobra

Material. MOUNT LICO (base): PEM R23934 (skin). **Identification.** This species is assignable to the *Naja melanoleuca* complex on the basis of having the 6th upper labial in contact with the postocular scale, and the presence of a single preocular scale (Fig. 4M–N). Wüster et al. (2018) recently confirmed the species status of *N. subfulva* based on morphological and genetic data. The closest match on GenBank is *N. subfulva* from South Africa (99% sequence similarity; MH337633). **Comments.** Brought to the campsite by a local who killed it in his *machamba* (plot of land).

Lamprophiidae

Boaedon fuliginosus (Boie, 1827)
Brown House Snake

Material. MOUNT LICO (base): PEM R23932. **Identification.** Scalation: 221 ventrals, 51 subcaudals, 1 preocular, 2 postoculars, 1+2+3 temporals, 8 upper labials with 4th and 5th entering the orbit, 9 lower labials with the 1st four in contact with the first sublingual, 25 midbody scale rows (Fig. 4O). The *Boaedon lineatus-fuliginosus-capensis* species complex is one of the most complicated groups of African snakes (Hughes 1997), and many species have been proposed or described in recent years (Trape and Mediannikov 2016). While Trape and Mediannikov (2016) retrict the name *Boaedon fuliginosus* to the darker form in West Africa that lacks distinct head markings, we tentatively assign our specimen to *B. fuliginosus* based on an overall plain coloration until the taxonomy of this group is resolved. The closest match on GenBank is *B. fuliginosus* from an unknown location (99% sequence similarity; JF357940). **Comments.** Collected in the *Eucalyptus* plantation near the campsite.

Lycophidion capense (Smith, 1831)
Cape Wolf Snake

Material. MOUNT LICO (base): PEM R23933. **Identification.** Dorsal scales in 17 rows, not stippled but white edged. The head is slightly depressed. The closest match on GenBank is *L. c. capense* from Mozambique (98.7% sequence similarity; AY612021). **Comments.** Collected in a *Eucalyptus* plantation.

Typhlopidae

Afrotyphlops mucruso (Peters, 1854)
Zambezi Blind Snake

Material. MOUNT LICO (base): PEM R23931 (skin). **Identification.** The third supralabial is not overlapping with the ocular shield, the snout is sharply angular with a broad oval-shaped rostral, and the dorsal pattern is blotched. The closest match on GenBank is *A. mucruso* from Mozambique (93% sequence similarity; AY612022). **Comments.** This is one of the largest species of typhlopid in Africa. The specimen was killed and brought to us by local villagers.

Viperidae

Bitis arietans Merrem, 1820
Puff Adder

Material. MOUNT LICO (base): Identification. Two species of *Bitis* are known for northern Mozambique, *B. arietans* and *B. gabonica*. The former is very common, while the latter is rarely seen in Mozambique. We assign the material from Mount Lico to *B. arietans* based on the characteristic v-shaped chevrons on the back and the absence of horns on the snout. **Comments.** Two individuals that were brought into Mount Lico base camp were photographed but not collected. A third individual was observed by a botanist on the granite slopes of Mount Socone.

Order Testudines

Testudinidae

Kinixys zombensis Hewitt, 1931
Eastern Hinge-backed Tortoise

MOUNT LICO (base): Identification. Carapace domed (not flat as in *K. spekii*) with a radial pattern. **Comments.** One individual was brought to the campsite, identified and released.

Unconfirmed Records

As the authors were part of a multi-disciplinary team of researchers, some casual observations worth mentioning were made. Two snakes were observed on Mount Lico and based on the overall description provided by our colleague they can be assigned to the genera *Psammophis* and *Naja*, respectively. Without any supporting photographs, however, species-level identification is not possible. Another important observation made on this mountain was of a small (ca. 100 mm), dull-colored lizard climbing up a tree (JB, pers. obs.). The species could not be identified based on the brief observation, except that it was not a *Lygodactylus*, the only arboreal gecko recorded on Mount Lico.

Discussion

Evergreen forests are a highly threatened ecosystem in Africa, especially in northern Mozambique, mainly due to the practice of slash-and-burn agriculture around the edges of these forests. This imposes a high risk of extinction for forest-dependent species such as the Endangered Pygmy Chameleon *Rhampholeon tilburyi* (Tolley et al. 2019a) now recorded for Mount Socone but previously only known from Mount Namuli. Similarly, *Arthroleptis francei* is a forest species considered Vulnerable on the IUCN Red List (IUCN SSC Amphibian Specialist Group and South African Frog Re-assessment Group 2016). It is not yet clear whether the form found on Mount Socone represents another population of this species or an undescribed species, and this distinction requires further research. Preliminary results suggest that *A. francei* represents a species complex, as does its congener *A. stenodactylus*, and this deserves further attention (N. Woest, pers. comm.).

The forest on top of Mount Lico is drier than other montane forests in the region and its herpetofauna is a combination of forest-dependent and miombo woodland species. For example, *A. stenodactylus* (montane form) and *Hyperolius substriatus* are species usually restricted to dense evergreen forests. Both are also found on other mountains in northern Mozambique (Conradie et al. 2016; Portik et al. 2013a), and the latter species was expected to occur on these mountains based on ecological niche models (Bittencourt-Silva et al. 2017). Another example is *Arthroleptis* sp., which, although being morphologically similar to *A. troglodytes*, is more similar in its 16S rRNA to an undescribed form found in dense evergreen forest on Mount Chiperone in 2017 by two of the authors (data not shown). *Arthroleptis* sp. was found in lower abundance (only two specimens were found) compared to its sympatric congeners (*A. stenodactylus* and *A. xenodactyloides*). Despite the fact that abundance data were not methodically collected in these surveys, it is important to state that these latter species were very abundant on top of Mount Lico.

In contrast, species typically associated with savannah or miombo woodland, such as *Breviceps mossambicus* and *Hyperolius tuberilinguis*, are also found on top of Mount Lico. Considering the relatively large number of *B. mossambicus* individuals found in a short period of time (six individuals in four days using one line of pitfall traps) and the fact that this species reproduces via direct development (no free-swimming tadpole stage; Channing et al. 2012; du Preez and Carruthers 2017), it is likely that this species is thriving on this mountain. Although more similar in its 16S rRNA, the specimen found on Mount Socone is morphologically different from the specimens found on Mount Lico. Additionally, the Mount Socone specimen was found in evergreen moist forest instead of miombo woodland, the usual habitat for *B. mossambicus*. The presence of species typical of miombo woodland and montane evergreen forest on top of Mount Lico is intriguing, not least because of the small area of this mountain, although their presence is likely due to the prevailing trade winds resulting in wet (eastern) and dry (western) sides to the mountain. Considering the short duration of these surveys, future surveys on Mount Lico are likely to reveal the presence of other species commonly found in this region, such as pygmy chameleons of genus *Rhampholeon*.

That the assemblage of species found on Mount Socone shows similarity to Mount Namuli (see Conradie et al. 2016; Portik et al. 2013a) is not surprising, considering the proximity of these two mountain blocks (ca. 40 km). Hence, it is plausible that other high-elevation species, such as *Nadzikambia baylissi, Hyperolius spinigularis*, *Strongylopus fuelleborni,* and *Nothophryne* are also present on Mount Socone. The caecilian genus *Scolecomorphus* is usually found in high-elevation forests in East Africa. So far, this genus has been recorded on six mountains in northern Mozambique (Serra Mecula: Branch 2004; Mount Namuli: Farooq and Conradie 2015; Mount Mabu: Conradie et al. 2016; Mounts Chiperone, Inago, and Ribáuè: unpub. data) and it is expected to occur on other mountains in this region.

The numbers of species found during similar surveys on other mountains in Mozambique vary from 12–18 for amphibians and 17–27 for reptiles (Conradie et al. 2016). The number of species found on Mount Lico could increase with additional effort, but is not expected to increase substantially owing to the relatively small size of this mountain. Mount Socone, on the other hand, has a large, denser, and moister forest at elevations above 500 m, and the area surveyed here only covered a fraction

of its expanse. The number of reptile and amphibian species on this mountain could be at least twice as many as were recorded here. However, Mount Socone is highly threatened by deforestation for local agriculture, while Mount Lico is very safe due to its inaccessibility. Ideally, both areas should be revisited during the rainy season, and preferably for longer periods, to improve the chances of finding elusive species and to obtain ecological and acoustic data. However, surveying Mount Lico during the rainy season could be a dangerous undertaking considering that access to the top of the mountain depends on specialist rock-climbing equipment.

Some of the records presented here merit additional comment, such as the new species of *Arthroleptis* found on Mount Lico. Preliminary results indicate that this form is also present on Mount Chiperone (see details in its **Species Account**) and a formal species description is in preparation. More information is required to assess the taxonomic and conservation statuses of this species. Similarly, the new species of *Breviceps* found on Mount Socone is also found on two neighboring mountains, Mount Namuli and Mount Inago (located ca. 50–60 km to the northeast). This species, which differs from any other *Breviceps* species in Mozambique, was only found in montane evergreen forest. Additional information about its ecology and geographic distribution are required to ascertain its conservation status.

If confirmed, the presence of *Mertensophryne loveridgei* would represent the southern limit of this species and the first vouchered specimen from Mozambique (see **Species Accounts** for details). However, if our record is confirmed to be *M. anotis*, it would represent a relictual population of this Endangered species (IUCN SSC Amphibian Specialist Group and South African Frog Re-assessment Group SA-FRoG 2017) which is only known from a few small isolated populations. Given the patchiness of herpetological surveys in northern Mozambique, it is plausible that *M. anotis* is more widespread than currently believed. Elucidation of this taxonomic conundrum will have important implications for the conservation status of the population on Mount Lico.

The *Nothophryne* found at the base of Mount Lico may possibly represent a new species, however the extent of its distribution is uncertain. The landscape of northern Mozambique is scattered with hundreds of inselbergs (granitic outcrops), which potentially provide ideal habitat for *Nothophryne* (see modelled distribution in Bittencourt-Silva et al. 2016). More evidence is needed to confirm the taxonomic status of the specimens found at the base of Mount Lico, and its conservation status is contingent upon this identification.

The two specimens of *Lygodactylus* sp. found on Mount Lico could represent a new population of *L. regulus*, a forest-dependent species only known from Mount Namuli that is considered to be Near Threatened due to its small extent of occurrence (Tolley et al. 2019b). Given that Mount Socone is situated between Mounts Namuli and Lico, this species could also be present in the forests of Mount Socone. However, based on differences in color pattern, the *Lygodactylus* from Mount Lico could possibly represent a new species.

Conclusions

Knowledge of the herpetofauna of northern Mozambique is gradually increasing but there is still much to be discovered and many puzzles to be solved. The species identified, and the associations between these species and those from neighboring mountains in the region, add to the evidence base that these mountains form part of a distinct ecoregion as alluded to by Bayliss et al. (2014). The species list presented here is by no means comprehensive. Nonetheless, it represents, the first herpetological surveys of Mounts Lico and Socone. This work is only a snapshot of their herpetofauna during a short survey in the dry season. This is especially true for Mount Socone, given the small proportion of the area surveyed in relation to the total area of that mountain. However, these findings add to our understanding of the biogeographic and evolutionary histories of African herpetofauna, as well as their distributions and conservation statuses. Finally, these findings also highlight the importance of taxonomic revisions of *Melanoseps*, *Arthroleptis francei*, *A. stenodactylus,* and the *Hyperolius marmoratus* group.

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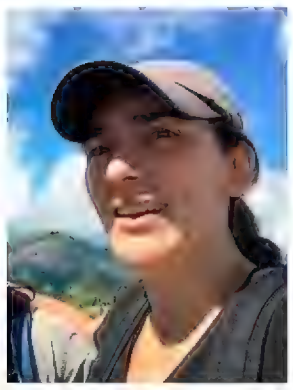

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